REMARKS/ARGUMENTS

The Office Action of 1 September 2005 and the inventor telephone interview of 10 November 2005 has been carefully considered. Applicant notes that the Examiner has newly rejected claims 1-18 under 35 USC 101; has maintained the rejections of claims 1-18 under 35 USC 112, first paragraph; and has presented a rejection of claims 1-17 under 35 USC 103(a) on new grounds. Claims 1-18 are in the application.

35 USC 101

Claims 1-18 were rejected under 1-18 under 35 USC 101. Applicant respectfully traverses the rejection of claims 1-18 under 35 USC 101. More specifically, Applicant respectfully traverses the Office Action statement that the claimed invention is directed to non-statutory subject matter.

In particular, as discussed during the Inventor interview, subsequent to the Office Action, the Board of Patent Appeals and Interferences has removed the "technical arts" test in Ex Parte Lundgren (BPAI, No. 2003-2088, 9/28/05).

With respect to the Office Action statement on "concrete result," regardless of the exact path (physical testing, calculations, or simulations) which is used for determining and selecting, Applicant submits that there is a useful result in selecting positions based on the information.

Applicant respectfully submits that claims 1-18 are in full compliance with the requirements of 35 USC 101.

35 USC 112, first paragraph

Applicant respectfully traverses the rejection of claims 1-18 under 35 USC 112, first paragraph.

During the inventor interview, Manoj Shah clarified that the tools are not part of the core of the "invention" on which coverage is sought. The invention, as claimed, is really in the various determinations and selections which are recited in each independent claim. The claims can be accomplished by physical testing, calculations, or simulations, but we are not claiming any particular method for the simulations and indicating that off-the-shelf modeling tools can be used. Manoj Shah explained the analogy to, when one writes a novel, one might use a pen and paper or a typewriter or a word processing tool such as Microsoft Word software. The tool is useful but not critical.

In a more specific response directed to the Office Action itself, the Office Action references an enablement rejection on page 3 and a written description rejection on page 5.

As stated in Applicant's first Amendment:

> With respect to enablement, Applicant respectfully traverses the ... statement that "advanced analytical methods" and "time stepping finite elements with rotation" mean that one of ordinary skill on the art would require too much experimentation. Applicant respectfully submits that commercially available products are available and were available at the time of filing. Three commercial vendor packages include, for example, Maxwell™ simulation software available from Ansoft Corp. (http://www.ansoft.com), Flux3D simulation software available from Magsoft (http://www.flux3d.com/flux3d_index.html), and MagNet simulation software available from Infolytica Corp. (http://www.infolytica.com/en/products/magnet/). Additionally, Applicant further indicated in paragraph 13 that determination can be made by physical testing itself. This would not even require such software or "undue experimentation."

With respect to written description, Applicant has clarified the fact that what is being measured is voltage or current and what is being minimized is voltage. Further, as can be seen from the statements above, paragraph 13 mentions both physical testing and software. Such software is and was available. Applicant was not trying to claim a specific type and was merely [indicating] that physical testing or simulation were paths toward [quantitatively fine-tuning the selection of] the design with minimal keybar voltage.

As stated in Applicant's Response to Final Rejection:

[W]hat was known is that, given a particular parameter and design constraints, such "advanced" tools can be programmed to find optimum settings. Basically, such software tools enable a user to input the design to be validated and to receive information about the design (meaning what is the effect if X keybars are used and/or if the phasebelts are offset by Y degrees) – they do not create the design itself. They are not required, but can save time and cost as compared with physical testing. . . .

Applicant continues to be convinced that no undue experimentation would be required to practice the invention. Per the Examiner's helpful suggestion, Applicant has submitted a Declaration which was briefly discussed during the inventor interview before Manoj explained the tool analogy. . If the Examiner is looking for any additional information in the form of such a declaration, Applicant requests the Examiner contact Applicant's representative.

Applicant notes that the most recent Office Action cites the "Wands factors" and will address each factor in turn.

With respect to breadth of claims (a) wherein the Examiner referred to the breadth including statutory and non-statutory methods, Applicant submits that the non-statutory methods matter has been addressed above with respect to the 35 USC 101 rejection. Applicant further submits that each claim recites specific identifiable steps or, with respect to claims 16 and 17, features.

With respect to nature of invention (b) wherein the Examiner referred to enablement and "advanced" analytical methods, Applicant submits that the nature of the invention is not related to the specific manner in which the effects on voltage or current (the electromagnetic effects) are determined but is in the very fact that they are used to make design selections.

With respect to state of the prior art (c), Applicants have found no prior art that teaches or suggests to the recited claims. Applicants respectfully submit that Perkins and Gieras references which were responded to in the last several office action responses and are not cited here, are not pertinent for the reasons Applicant articulated in earlier responses: The "stator bars" of page 28 (Testing) of Perkins are not "keybars" as claimed in Applicant's Application. The testing of such "stator bars" on page 24 does not appear to have anything to do with "keybar" location or testing. Gieras does not disclose, teach, or suggest modifying keybar design to minimize keybar voltage. In Gieras, the phrase "phase belt" is used once to generally describe a group of conductors belonging to a particular phase of the machine that are placed in sequential order. The placement of the phase belt is not described as being optimal with respect to keybars.

With regard to level of one of ordinary skill (d in first list and not indicated in discussion list) and quantity of experimentation needed to make or use the invention based on content of disclosure (discussed as g), Applicant is submitting herewith a declaration from Dr. Brian Gott which states that:

On reviewing the application, I found that the concepts were sufficiently well described to enable a design engineer familiar with the design and construction of large rotating electrical machines to apply them after suitable finite element analysis of the electromagnetic design of a specific machine. One method for performing the finite element analysis is to use simulation software. A design engineer could use such software after familiarizing himself with the software through self study or an introductory course.

The terms used in the description are clear and well understood by such a designer, and an engineer familiar with the design of rotating electrical machinery can readily understand the concepts described in the claims. The analysis needed is of the type routinely carried out by electromagnetic design engineers employed by companies engaged in the design and manufacture of large electrical machinery. The state of the art of this analysis is such that the results can be directly applied to the machine design without any need for experimentation. The accuracy of the analysis would typically be validated during the routine testing of the completed machine, and would not entail unusual effort or expense.

With respect to level of predictability (discussed as d), Applicant submits that, although there are different approaches to doing the voltage or current effect determination (physical, modeling, simulation), such approaches arrive at the same ultimate claim of "determining" and "selecting."

With respect to amount of direction (discussed as e), as stated above, although several examples were provided for illustrative purpose, the core of the invention is not in how voltage and current are determined but is in the fact that they are at all and that they are used to minimize keybar voltage.

With respect to working examples (discussed as f), Applicant agrees that no "reduction to practice" type example has been provided.

Applicant notes that the Office Action statements regarding the written description mirror section (d) of the Wants test with respect to the "arrive at different solutions" statement. Applicant respectfully disagrees for the reasons stated above.

Thus, Applicant respectfully submits that claims 1-18 are in full compliance with the requirements of 35 USC 112, first paragraph.

35 USC 103(a) rejection of claims 1-17

Applicant respectfully traverses the rejection of claims 1-17 under "Applicant's Own Admission" in view of Infolytica Corporation, FastTrack Reference Manual for MagNet 52, 1996 (MagNet Manual) and further in view of Durantay, L. et al., "Large Band Reduction of Magnet Vibrations of Induction Machines with 'Breaking of Impedance' Interface," Int'l Conf. Of Electric Machines and Drives, May 9-12, 1999, pp 475-477 (Durantay).

During the inventor interview, Manoj Shah discussed Durantay with his statements being summarized below in the paragraph starting with "Durantay is directed to ... ." Additionally, Examiner Sharon discussed that his art unit and his expertise is in software inventions and that he might want to do another search or consult with an expert in electromagnetic machines before arriving at a conclusion on how to proceed further on the 35 USC 103 rejection

Applicant is confused as to why this "admission" allegation is resurfacing. Similar language which the Examiner is asserting as an admission was presented by Applicant in the Office Action faxed 3 January 2005.

In the Final Office Action dated 22 March 2005, the Examiner asserted that this was an admission and rejected the claims under 35 USC 102. Applicants traversed the "admission" in the Office action with language in a 16 May 2005 amendment:

> The Examiner interpreted this as some sort of admission that the entire claimed technique itself was known (paragraph 42 (page 26)). However, what was known is that, given a particular parameter and design constraints, such "advanced" tools can be programmed to find optimum settings. Basically, such software tools enable a user to input the design to be validated and to receive information about the design (meaning what is the effect if X keybars are used and/or if the phasebelts are offset by Y degrees) – they do not create the design itself. They are not required, but can save time and cost as compared with physical testing. ... .
>
> ... .
>
> As stated above, Applicant did not make an "admission" in the prior Amendment. Instead, Applicant referenced commercially available software for testing of various keybar position or number effects. Although they, as well as other modeling techniques, were usable to validate the invention, Applicant traverses any suggestion that such software packages described or disclosed it.

In the Advisory Action dated 9 June 2005, the Examiner wrote that:

> Applicant's reply has overcome the following rejection(2): 35 USC 102(b) rejection of claims 1-17 based on Applicant's own admission.

Because of this notation in the Advisory Action, Applicant did not address the alleged "admission" when submitting the Amendment dated 21 June 2005 and continued to feel that the language articulated in the present office action is not an "admission" with respect to the core recitations of the invention. Furthermore, in the present Office Action, Applicant is not sure what portion of the claims is being alleged as the admission.

As Manoj Shah mentioned in the interview, Applicant does believe modeling tools were commercially available and could have been used. That does not mean Applicant is admitting that tools were used. Applicant is merely stating that tools were available that could have been used had one known about our invention, bought the tool, and read the tool's instruction manual.

In a more specific response directed to the Office Action itself, with respect to the MagNet Manual, Applicant agrees that this manual does describe how to use the software for "computerized simulation and analysis of electromagnetic devices" (introduction), and does not describe measurement of keybar voltage or current. Applicant also notes that page 1-8 a single stator slot device can be loaded several times to reduce modeling time.

With respect to Durantay, Applicant agrees that Durantay describes magnetic forces generating stator vibrations which in turn generate noise as well as the use of finite element modeling. Applicant traverses however, the subsequent remarks in the office action and state that a prima facie case for a 35 USC 103 rejection has not been made. For ease of reference, such remarks are as follows:

> While this reference does not expressly teach the use of "keybars", it does teach the vibration of the stator frame in general (e.g., the variable K_{a_f} is the stiffness of the stator-frame interface in Eq. 6, on p.476). The keybars are elements in the stator frame. While this reference does not expressly teach the use of "phase belts", it does teach "mode shape" (See Table III on p.476). In addition, it would be possible to derive "keybar voltage" and "keybar current" from the magnetic induct ion equation (Eq. 9 on p.476).
>
> It would have been obvious to one of ordinary skill in the art at the time the invention was made to

modify the teachings of Applicant's Own Admission with those of Durantay, because MagNet would be an appropriate tool for implementing the teachings of Durantay.

Durantay is directed to a mechanical solution and not an electromagnetic solution. Although Durantay does relate to magnetic fields in the airgap of an induction machine that create vibratory forces which result in noise, Durantay does not address any modification of the source of the noise. Instead, Durantay appears to describe how to increase the impedance along the path of this vibratory force transmission so that the noise level will reduce. He is suggesting the use of mechanical impedance with different normal and tangential properties to achieve the goals. Equation (6) has the term Ks_f. It is the MECHANICAL stiffness of the core-frame interface. Control of this attribute is what Durantay's mission is as it affects the noise level. Equations (9) and (10) are from standard text books in Electromagnetics. It appears that Durantay included them here ONLY for the sake of completeness of the paper. It would not be possible to derive Keybar voltage or current information from these equations.

Further, these vague references to stators perhaps including keybars and perhaps including phase belts and "it would be possible" do not seem to rise to the level of what is required for a 35 USC 103 rejection. For 35 USC 103 rejections, as stated by MPEP 706.02(j):

> [T]he examiner should set forth in the Office action:
> (A) the relevant teachings of the prior art relied upon, preferably with reference to the relevant column or page number(s) and line number(s) where appropriate,
> (B) the difference or differences in the claim over the applied reference(s),
> (C) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and
> (D) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification.
>
> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must be found in the prior art and not based on the applicant's disclosure.

In the above rejection, the differences are minimized and it is not clear why one would have been motivated to modify the prior art to come up with the claimed subject matter is provided. The claimed recitations which Applicant is referencing in the independent claims are as follows:

> 1 determining effects on at least one of keybar voltage or keybar current of adjusting positions of the keybars with respect to positions of the phase belts; and selecting a position of the keybars with respect to a position of the phase belts which provides minimal keybar voltage.

> 5 determining effects on at least one of keybar voltage or keybar current of adjusting positions of the keybars with respect to positions of the phase belts, adjusting the number of keybars, and adjusting the number of stator slots; and selecting a position of the keybars with respect to a position of the phase belts, a number of the keybars, and a number of stator slots which collectively provide minimal keybar voltage.

7 determining effects on at least one of keybar voltage or keybar current of adjusting the number of keybars; and selecting a number of the keybars which provides minimal keybar voltage.

9 determining effects on at least one of keybar voltage or keybar current of adjusting the number of stator slots; and selecting a number of the stator slots which provides minimal keybar voltage.

10 selecting a direction of rotation of the rotor which provides minimal keybar voltage.

11 means for determining effects on at least one of keybar voltage or keybar current of adjusting positions of the keybars with respect to positions of the phase belts; and means for selecting a position of the keybars with respect to a position of the phase belts which provides minimal keybar voltage.

13 means for determining effects on at least one of keybar voltage or keybar current of adjusting positions of the keybars with respect to positions of the phase belts, adjusting the number of keybars, and adjusting the number of stator slots; and means for selecting a position of the keybars with respect to a position of the phase belts, a number of the keybars, and a number of stator slots which collectively provides minimal keybar voltage.

14 means for determining effects on at least one of keybar voltage or keybar current of adjusting the number of keybars; and means for selecting a number of the keybars which provides minimal keybar voltage.

15 (previously presented). means for determining effects on at least one of keybar voltage or keybar current of adjusting the number of stator slots; and means for selecting a number of the stator slots which provides minimal keybar voltage.

16 (previously presented). a computer for performing simulations to determine effects on at least one of keybar voltage or keybar current of adjusting positions of the keybars with respect to positions of the phase belts.

17 (previously presented). a computer for performing simulations to determine effects on at least one of keybar voltage or keybar current of adjusting positions of the keybars with respect to positions of the phase belts, adjusting the number of keybars, and adjusting the number of stator slots.

With respect to claim 1, none of the references teach or suggest determining effects on at least one of keybar voltage or keybar current of adjusting positions of the keybars with respect to positions of the phase belts, and selecting a position of the keybars with respect to a position of the phase belts which provides minimal keybar voltage. The facts that a stator might have a keybar or phase belt and that stator vibration reduction is desirable do not teach or suggest these recitations of claim 1

Claims 11 has analogous recitations in comparison with claim 1.

Claim 7 refers to number of keybars as compared with the "phase belt positions" of claim 1. These specific recitations are similarly not taught or suggested.

Claim 9 refers to number of stator slots are compared with "phase belt positions" of claim 1. These specific recitations are similarly not taught or suggested.

Claim 10 refers to the direction of rotation which is additionally not taught or suggested.

Claims 5 and 17 refer to a combination of phase belt position, number of keybars, and number of slots and are likewise believed to be in condition for allowance.

Each remaining claim depends from one of the above discussed claims 1, 5, 7, 9, 11, and 16-17.

Appl. No. 09/681,571
Amdt. Dated 15 November 2005
Reply to Office action of 1 September 2005

Summary

Accordingly, Applicant respectfully submits that the claims define allowable subject matter over the applied art. Withdrawal of the rejections is respectfully requested.

Respectfully submitted,

By _____

Ann M. Agosti
Reg. No. 37,372
General Electric Company
Building K1, Room 3A66
One Research Circle
Niskayuna, New York 12309
Telephone: (518) 387-7713